

Mole Problems #0 - Answer Key

1. a) Fe_2O_3

$$\left. \begin{array}{l} 2 \times \text{Fe} = 2 \text{ mol} \times 55.8 \text{ g/mol} = 111.6 \text{ g} \\ 3 \times \text{O} = 3 \text{ mol} \times 16.0 \text{ g/mol} = 48.0 \text{ g} \end{array} \right\} \text{ADD} = \boxed{159.6 \text{ g}}$$

b) H_3PO_4

$$\left. \begin{array}{l} 3 \times \text{H} = 3 \text{ mol} \times 1.0 \text{ g/mol} = 3.0 \text{ g} \\ 1 \times \text{P} = 1 \text{ mol} \times 31.0 \text{ g/mol} = 31.0 \text{ g} \\ 4 \times \text{O} = 4 \text{ mol} \times 16.0 \text{ g/mol} = 64.0 \text{ g} \end{array} \right\} \text{ADD} = \boxed{98.0 \text{ g}}$$

c) Be_5As_2

$$\left. \begin{array}{l} 5 \times \text{Be} = 5 \text{ mol} \times 9.0 \text{ g/mol} = 45.0 \text{ g} \\ 2 \times \text{As} = 2 \text{ mol} \times 74.9 \text{ g/mol} = 149.8 \text{ g} \end{array} \right\} \text{ADD} = \boxed{194.8 \text{ g}}$$

d) Rb_2SO_3 = Rubidium sulfate

$$\left. \begin{array}{l} 2 \times \text{Rb} = 2 \text{ mol} \times 85.5 \text{ g/mol} = 171.0 \text{ g} \\ 1 \times \text{S} = 1 \text{ mol} \times 32.1 \text{ g/mol} = 32.1 \text{ g} \\ 3 \times \text{O} = 3 \text{ mol} \times 16.0 \text{ g/mol} = 48.0 \text{ g} \end{array} \right\} \text{ADD} = \boxed{251.1 \text{ g}}$$

e) $\text{Al}_2(\text{SO}_4)_3$ = Aluminum sulfate

$$\left. \begin{array}{l} 2 \times \text{Al} = 2 \text{ mol} \times 27.0 \text{ g/mol} = 54.0 \text{ g} \\ 3 \times \text{S} = 3 \text{ mol} \times 32.1 \text{ g/mol} = 96.3 \text{ g} \\ 12 \times \text{O} = 12 \text{ mol} \times 16.0 \text{ g/mol} = 192.0 \text{ g} \end{array} \right\} \text{ADD} = \boxed{342.3 \text{ g}}$$

f) $\text{Mg}(\text{OH})_2$ = Magnesium hydroxide

$$\left. \begin{array}{l} 1 \times \text{Mg} = 1 \text{ mol} \times 24.3 \text{ g/mol} = 24.3 \text{ g} \\ 2 \times \text{O} = 2 \text{ mol} \times 16.0 \text{ g/mol} = 32.0 \text{ g} \\ 2 \times \text{H} = 2 \text{ mol} \times 1.0 \text{ g/mol} = 2.0 \text{ g} \end{array} \right\} \text{ADD} = \boxed{58.3 \text{ g}}$$

$$2. \text{ a) } \begin{array}{l|l} 2.50 \text{ mol } \text{K}_2\text{CrO}_4 & 194.2 \text{ g } \text{K}_2\text{CrO}_4 \\ \hline & 1 \text{ mol } \text{K}_2\text{CrO}_4 \end{array}$$

$$= 485.5 \text{ g } \text{K}_2\text{CrO}_4$$

$$= \boxed{486 \text{ g } \text{K}_2\text{CrO}_4 \text{ (SIG FIGS)}}$$

$$\text{ b) } \begin{array}{l|l} 0.25 \text{ mol } \text{Ba}(\text{NO}_3)_2 & 261.3 \text{ g } \text{Ba}(\text{NO}_3)_2 \\ \hline & 1 \text{ mol } \text{Ba}(\text{NO}_3)_2 \end{array}$$

$$= 65.3 \text{ g } \text{Ba}(\text{NO}_3)_2$$

$$= \boxed{65 \text{ g } \text{Ba}(\text{NO}_3)_2}$$

$$c) \frac{0.375 \text{ mol Na}_2\text{Cr}_2\text{O}_7}{1 \text{ mol Na}_2\text{Cr}_2\text{O}_7} \times 262 \text{ g Na}_2\text{Cr}_2\text{O}_7 = 98.3 \text{ g Na}_2\text{Cr}_2\text{O}_7$$

$$d) \frac{0.25 \text{ mol NaCH}_3\text{COO}}{1 \text{ mol NaCH}_3\text{COO}} \times 82 \text{ g NaCH}_3\text{COO} = 21 \text{ g NaCH}_3\text{COO}$$

$$e) \frac{0.418 \text{ mol Fe(NO}_3)_3}{1 \text{ mol Fe(NO}_3)_3} \times 241.8 \text{ g Fe(NO}_3)_3 = 101 \text{ g Fe(NO}_3)_3$$

$$f) \frac{1.872 \text{ mol Cu(CH}_3\text{COO)}_2}{1 \text{ mol Cu(CH}_3\text{COO)}_2} \times 181.5 \text{ g Cu(CH}_3\text{COO)}_2 = 339.8 \text{ g Cu(CH}_3\text{COO)}_2$$

$$3. a) \frac{50.0 \text{ g C}_6\text{H}_{12}\text{O}_6}{180 \text{ g C}_6\text{H}_{12}\text{O}_6} \times 1 \text{ mol C}_6\text{H}_{12}\text{O}_6 = 0.278 \text{ mol C}_6\text{H}_{12}\text{O}_6$$

$$b) \frac{25.00 \text{ g K}_3\text{PO}_4}{212.3 \text{ g K}_3\text{PO}_4} \times 1 \text{ mol K}_3\text{PO}_4 = 0.1178 \text{ mol K}_3\text{PO}_4$$

$$c) \frac{15.57 \text{ g Bi(OH)}_3}{260.0 \text{ g Bi(OH)}_3} \times 1 \text{ mol Bi(OH)}_3 = 0.05988 \text{ mol Bi(OH)}_3$$

$$d) \frac{3.50 \text{ g AsCl}_3}{181.4 \text{ g AsCl}_3} \times 1 \text{ mol AsCl}_3 = 0.0193 \text{ mol AsCl}_3$$

$$e) \frac{27.85 \text{ g Fe}_3(\text{PO}_4)_2}{357.4 \text{ g Fe}_3(\text{PO}_4)_2} \times 1 \text{ mol Fe}_3(\text{PO}_4)_2 = 0.07792 \text{ mol Fe}_3(\text{PO}_4)_2$$

$$f) \frac{4.90 \text{ g Al}_2(\text{CO}_3)_3}{234 \text{ g Al}_2(\text{CO}_3)_3} \times 1 \text{ mol Al}_2(\text{CO}_3)_3 = 0.0209 \text{ mol Al}_2(\text{CO}_3)_3$$